

Inventor: HALL ET AL
 Serial No.: 09/889,370
 Filing Date: 07/17/2001
 Examiner: McHENRY, Kevin L.
 Group Art Unit: 1725

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1-16 (cancelled)

17. (Currently amended) A reactor for the processing of a gaseous medium, including a reactor bed, conduits for constraining a gaseous medium to be processed to flow through the reactor bed, a power supply unit adapted to generate and apply a potential across the reactor bed for exciting an electric discharge in the gaseous medium flowing through the reactor bed, wherein the reactor is of the dielectric barrier discharge type and in that the reactor bed and power supply unit are adjacent, and connected directly together electrically and are enclosed in an electrically conducting enclosure connected to be maintained at ground potential.

18. (Previously presented) A reactor according to claim 17, wherein the said potential is applied across the reactor bed via electrodes in contact with the reactor bed material and one or both sides of the electrodes are coated with a dielectric material.

19. Cancelled.

20. (Currently amended) A reactor according to claim 17, wherein the reactor bed consists of a cylindrical body of gas permeable dielectric material contained between an inner concentric gas permeable electrode and an outer concentric gas permeable electrode the outer one electrode being connected

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directly to ground and the inner ~~one electrode~~ being connected directly to the power supply unit and the gaseous medium is constrained to pass radially through the ~~the~~ reactor bed.

21. (Previously presented) A reactor according to claim 17, wherein the reactor bed consists of a cylindrical body of gas permeable dielectric material contained between an outer non-permeable electrode and an inner non-permeable electrode, the outer electrode being connected to ground and the inner electrode being connected directly to the power supply unit and the gaseous medium is constrained to flow axially through the reactor bed.

22. (Previously presented) A reactor according to claim 17, wherein the reactor bed of gas permeable dielectric material is in the form of spheres, pellets, extrudates, fibers, sheets, coils, granules, wafers, meshes, frits, foams, honeycomb monolith or membrane or combinations of one or more of the above forms.

23. (Previously presented) A reactor according to claim 17, wherein the power supply unit is adapted to produce a pulsed or alternating output voltage.

24. (Previously presented) A reactor according to claim 17, wherein there is included means for making the resonant frequency of the electrical circuit including the reactor bed substantially equal to the frequency of the output voltage from the power supply unit.

25. (Previously presented) A reactor according to claim 24, wherein the means for making the resonant frequency of the electrical circuit including the reactor bed substantially equal

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to that of output voltage from the power supply is an appropriate inductance connected in parallel with the reactor bed circuit.

26. (Previously presented) A reactor according to claim 24, wherein the power supply unit is adapted to generate a voltage of the order of tens of kilovolts at a frequency within the range 50 Hz to 15 kHz.

27. (Previously presented) A reactor according to claim 17 adapted to be incorporated into the exhaust system of an internal combustion engine.

28. (Currently Amended) A reactor according to claim 27, wherein there is included a step-up transformer having primary and secondary windings, an ac generator connected to the primary winding of the transformer and means for maintaining the frequency of the output from the ac generator at a pre-determined value regardless of variations in the rotational speed of the internal combustion engine in the exhaust system of which the reactor is incorporated.

29. (Currently Amended) A reactor for the processing of a gaseous medium, including a reactor bed, conduits for constraining a gaseous medium to be processed to flow through the reactor bed, a power supply unit adapted to generate and apply a potential across the reactor bed for exciting an electric discharge in the gaseous medium flowing through the reactor bed, wherein the reactor is of the dielectric barrier discharge type and in that the reactor bed and power supply unit are adjacent, and connected directly together electrically, wherein there is included means for making the resonant frequency of the electrical circuit including the reactor bed substantially equal to

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the frequency of the output voltage from the power supply unit,
wherein said reactor is adapted to be incorporated into the
exhaust system of an internal combustion engine, wherein there is
included a step-up transformer having primary and secondary
windings, an ac generator connected to the primary winding of the
transformer and means for maintaining the frequency of the output
from the ac generator at a pre-determined value regardless of
variations in the rotational speed of the internal combustion
engine in the exhaust system of which the reactor is
incorporated, and A reactor according to claim 20, wherein the ac
generator is arranged to be driven by the engine via a constant
speed drive system.

30. (Previously presented) A reactor according to claim 29,
wherein the constant speed drive system consists of a hydraulic
drive unit the drive efficiency of which is varied inversely with
the rotational speed of the engine.

31. (Previously presented) A reactor according to claim 29,
wherein the constant speed drive system consists of a stepless
variable speed transmission system the effective gear ratio of
which is varied inversely with the rotational speed of the
engine.

32. (Previously presented) A reactor according to claim 29,
wherein the constant speed drive system includes an
electromagnetic clutch the drive efficiency of which is varied
inversely with the rotational speed of the engine.

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Respectfully submitted,

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